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BOOKS BUILD BETTER BRAINS

HOW PROMOTING LITERACY IS KEY TO EARLY BRAIN AND CHILD DEVELOPMENT

DIPESH NAVSARIA, MPH, MSLIS, MD



DEPARTMENT OF PEDIATRICS

UW SCHOOL OF MEDICINE & PUBLIC HEALTH

SCHOOL OF LIBRARY AND INFORMATION STUDIES UNIVERSITY OF WISCONSIN-MADISON

Reach Out & Read*



MEDICAL DIRECTOR, REACH OUT AND READ WISCONSIN

Disclosure

I have no relevant financial relationships to disclose.

I will not discuss off-label use or investigational use in my presentation.

Although...



I don't know if "mouthing" is an FDA-approved use of board books.



A stroll through the Early Brain

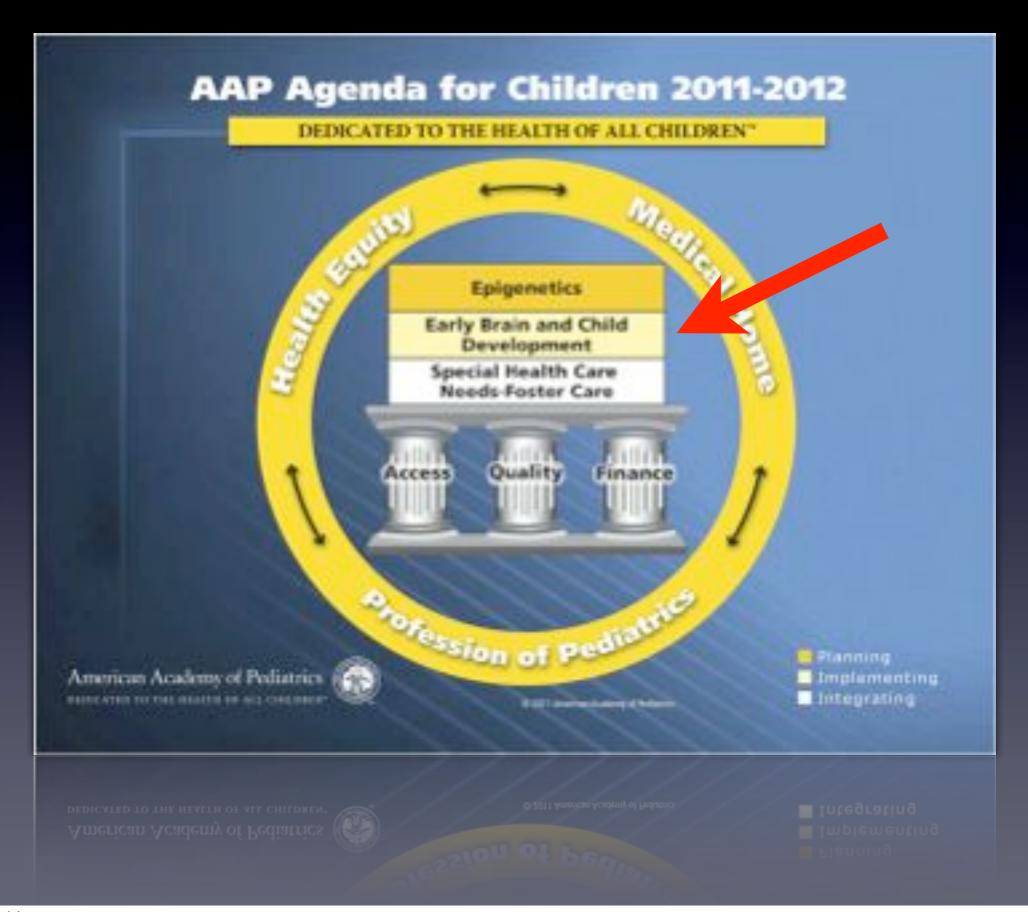
Reading Reality

Reach Out and Read

Tirst, a story...

Part One

A Stroll Through the Early Brain



from *The Science of Early Childhood Development* National Scientific Council on the Developing Child, 2007

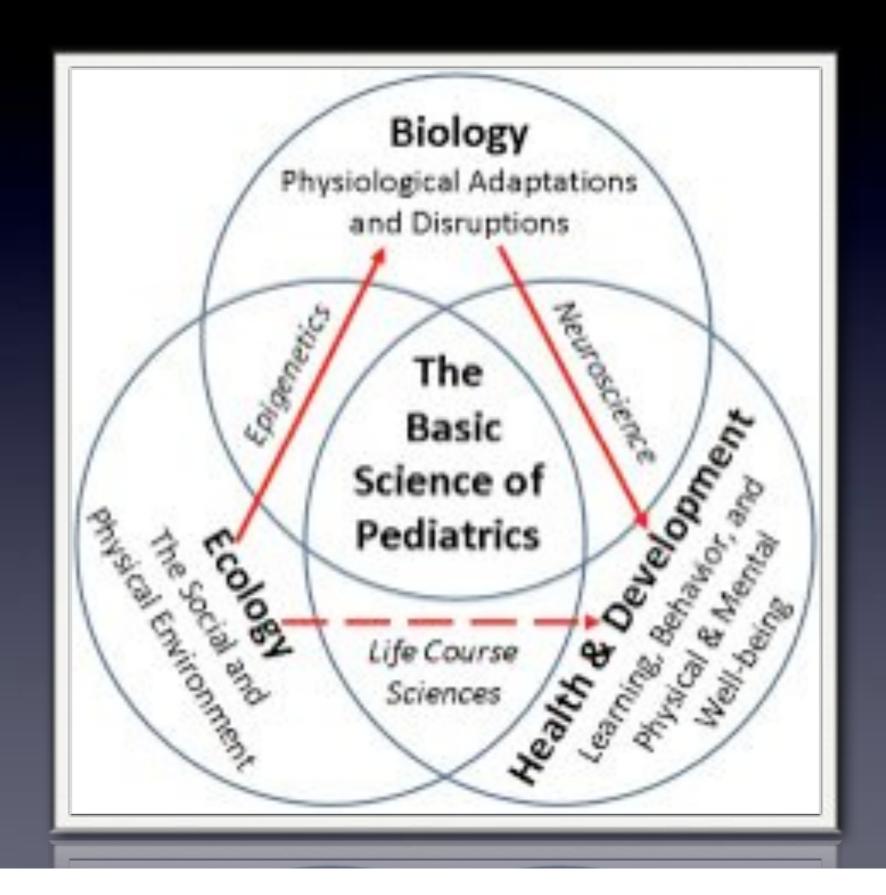
EARLY BRAIN AND CHILD DEVELOPMENT

Child development is a foundation for community development and economic development, as capable children become the foundation of a prosperous and sustainable society.

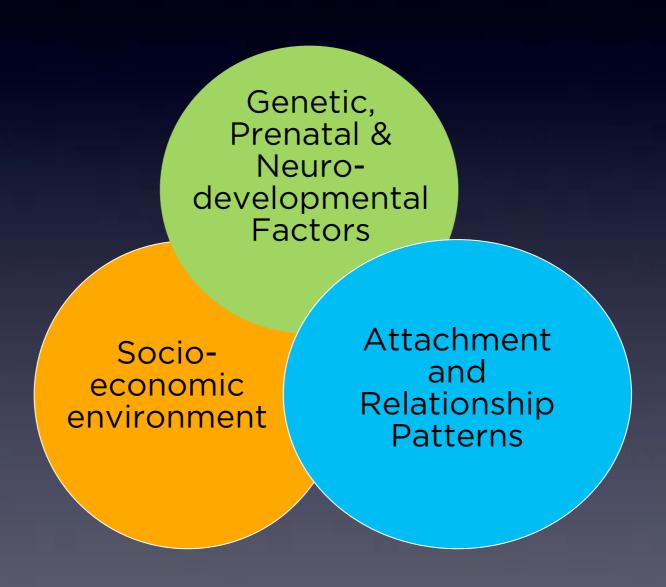
Brains are built over time.

Creative Commons-licensed work by flickr user Andrew Mace—

Eco-biodevelopmental Model



The 3-legged stool for developmental and health trajectories



EARLY BRAIN AND HILD DEVELOPMENT

The interactive influences of genes and experience literally shape the architecture of the developing brain and the active ingredient is the "serve and return" nature of children's engagement in relationships with their parents and other caregivers in their family or community.

The Face to Face Paradigm Edward Z Tronick



EARLY BRAIN AND CHILD DEVELOPMENT

4

Both brain architecture and developing abilities are built "from the bottom up" with simple circuits and skills providing the scaffolding for more advanced circuits and skills over time.

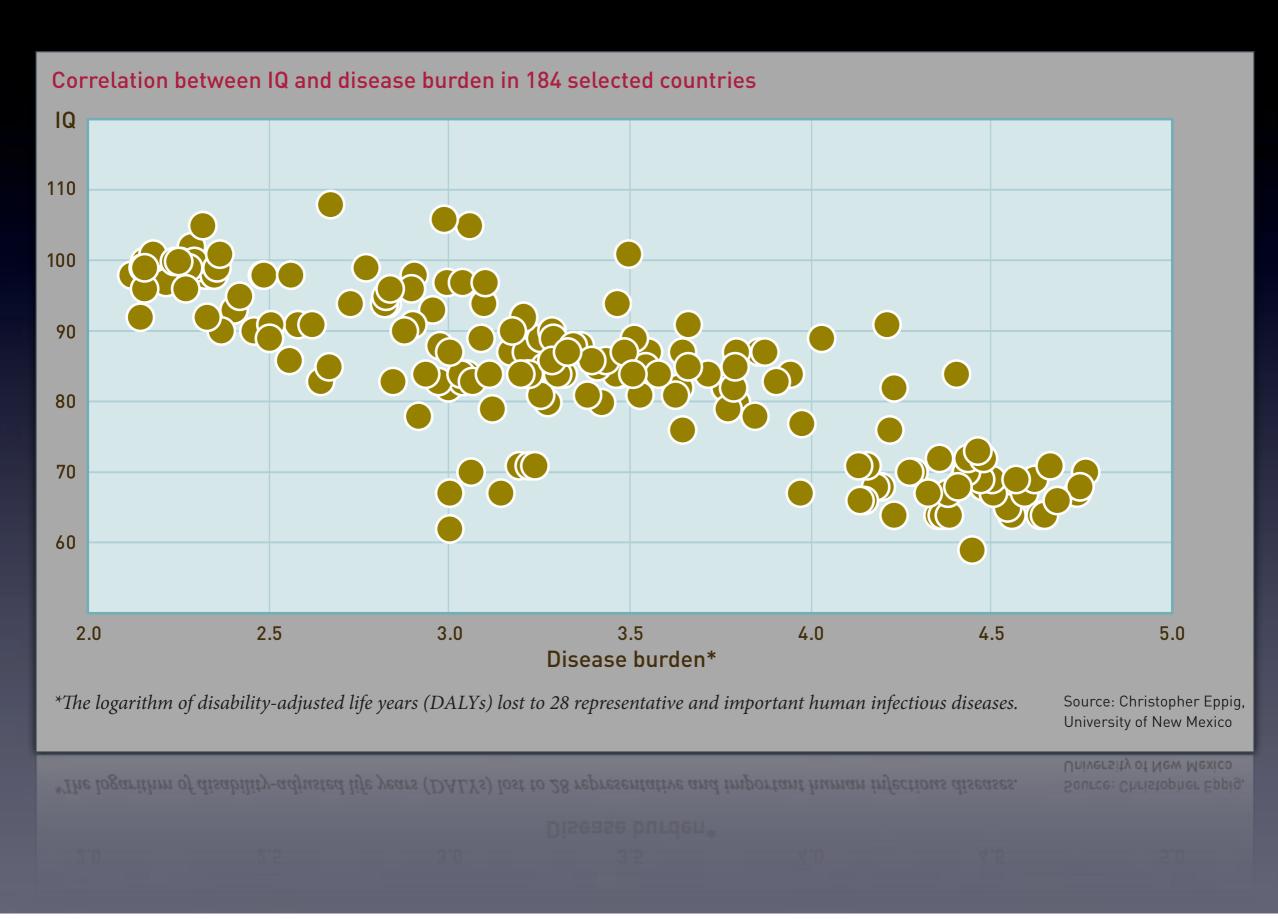
Creative Commons-licensed work by flickr user Liz Henry

EARLY BRAIN AND CHILD DEVELOPMENT

5

Toxic stress in early childhood is associated with persistent effects on the nervous system and stress hormone systems that can damage developing brain architecture and lead to lifelong problems in learning, behavior and both physical and mental health.

Creative Commons-licensed work by flickr user Pedro Klien





THE STRESS RESPONSE:

increases in cortisol and epinephrine

Three Levels of Stress Response

Positive Brief increases in heart rate,

Tolerable Serious, temporary stress responses, buffered by supportive relationships.

mild elevations in stress hormone levels.

Toxic

Prolonged activation of stress response systems in the absence of protective relationships.

Source: Center on the Developing Child at Harvard University

Social-emotional buffering is the primary factor distinguishing level of stress.

Andy Garner, MD

Adversity & Toxic Stress

Toxic stress is the key intergenerational transmitter of social and health disparities

POSITIVE STRESS

Child sees someone approaching with their immunization syringe

Parent leaving on the first day of preschool

TOLERABLE STRESS

Death of a family member

Serious illness

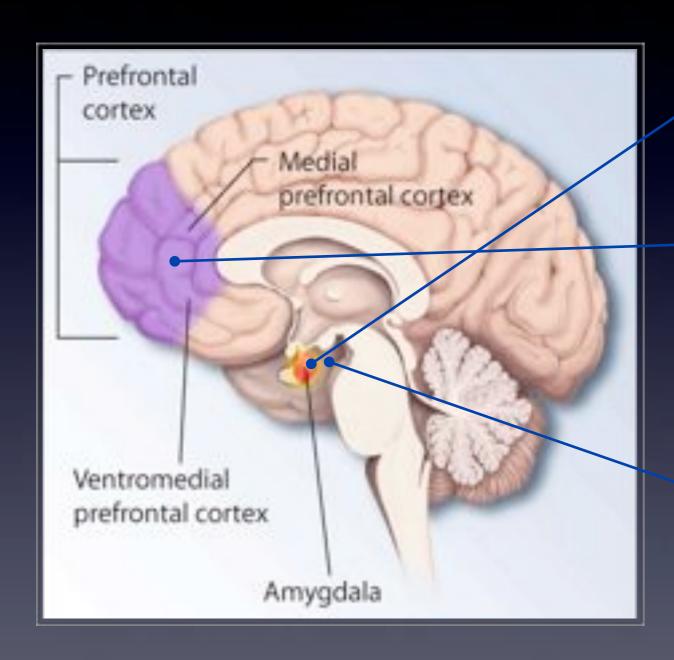
Natural disaster

What if it's worse?
What if there's no supportive relationships?

Child abuse Parental substance abuse Homelessness

TOXIC STRESS

What happens?



Amygdala:

activates the stress response *Toxic stress:* enlargement

Prefrontal cortex:

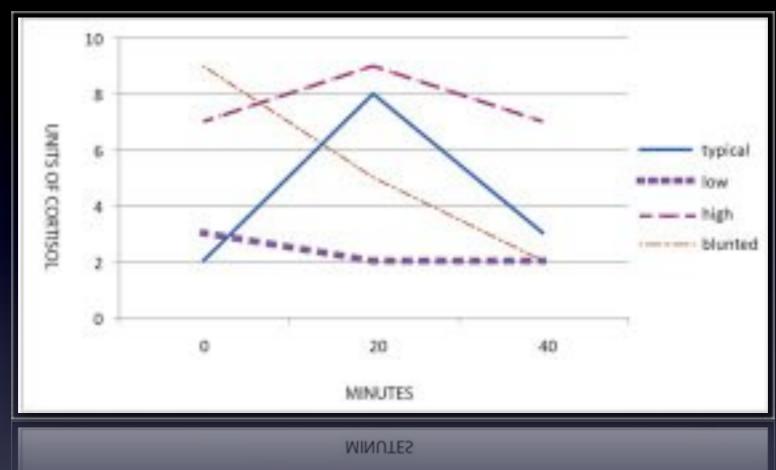
usually a check to the amygdala *Toxic stress:* loss of neurons, less able to function

Hippocampus:

major role in memory and mood *Toxic stress:* impairment in understanding and emotion

Freely-reproducible image from the National Institutes of Health

POVERTY IS NEUROTOXIC



Children with "typical" cortisol response had higher executive function, and were rated as having more self-control in the classroom.

Those with a flat (high or low) or blunted response had low levels of executive function and were rated as having poor self-regulation.

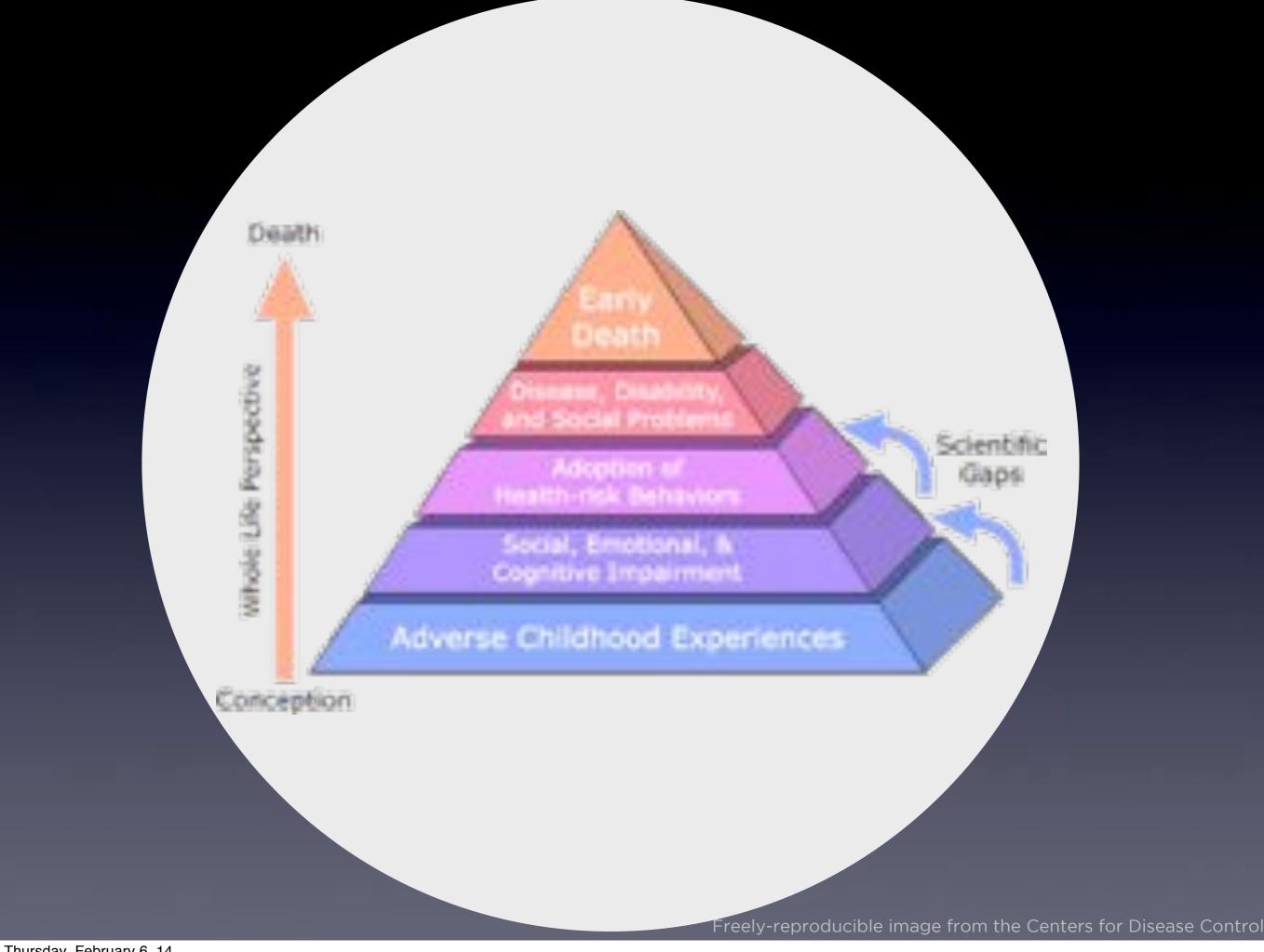
POVERTY IS NEUROTOXIC

Next, children in a large (1200) study whose mothers engaged in "scaffolding" during play had lower cortisol levels and were more attentive.

Those who were more authoritative had higher cortisol levels and were found to be less attentive.

This was found at 7 months of age and again at 15 months.

They also found that the more impoverished the family, the less likely they were to engage in scaffolding.



THE ADVERSE CHILDHOOD EXPERIENCES STUDY

The Most Important Study You've (Probably) Never Heard Of.

In 1985, Dr Vincent Felitti noticed many patients in his obesity treatment programs had prior history of abuse or trauma

The CDC worked with Kaiser Permanente and looked retrospectively at over 17,000 patients.

This was the first study to simultaneously assess childhood exposure to multiple types of abuse, neglect, domestic violence and serious household dysfunction.

THE ADVERSE CHILDHOOD EXPERIENCES STUDY

Study participants were middle-class Americans from San Diego, 80% white, 74% attended college, average age of 57, split evenly between men and women.

Not exactly an improverished, "at-risk" population.

THE ADVERSE CHILDHOOD EXPERIENCES STUDY

Emotional Abuse (10%)
Physical Abuse (26%)
Sexual Abuse (21%)

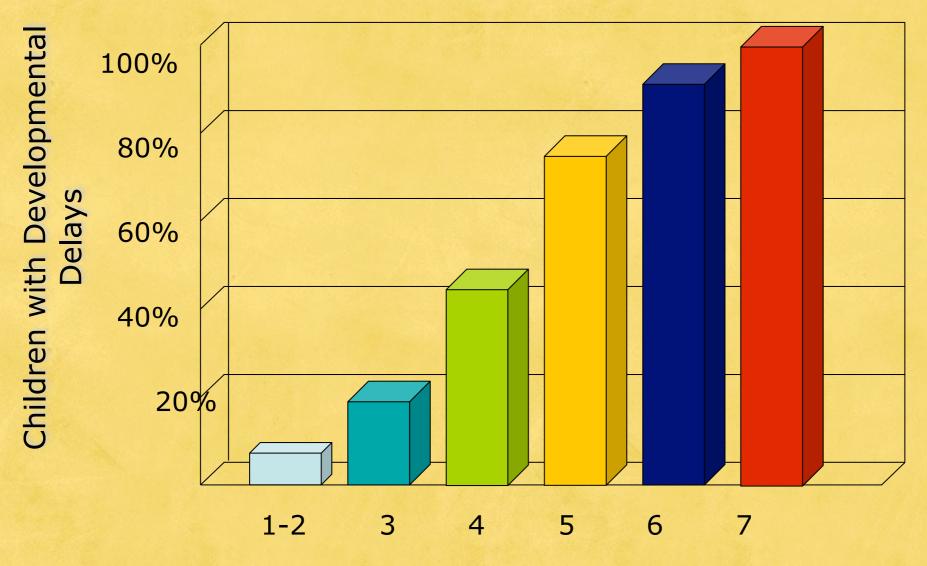
Emotional Neglect (15%)
Physical Neglect (10%)

Mother treated violently (13%)
Household substance abuse (28%)
Household mental illness (20%)
Parental separation or divorce (24%)
Incarcerated household member (6%)

ACE Score (one point for each category listed)	Prevalence in study
O	33%
1	26%
2	16%
3	10%
4	6%
5	5%
6	6%

Not only are they unexpectedly common...
...their effects are cumulative.

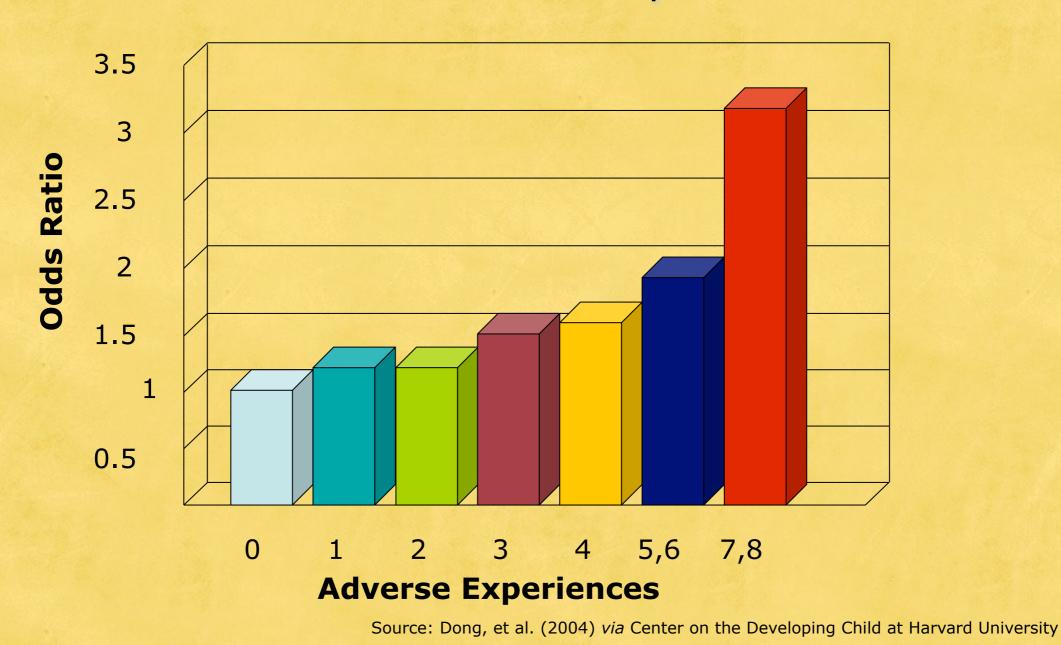
Significant Adversity Impairs Development in the First Three Years



Number of Risk Factors

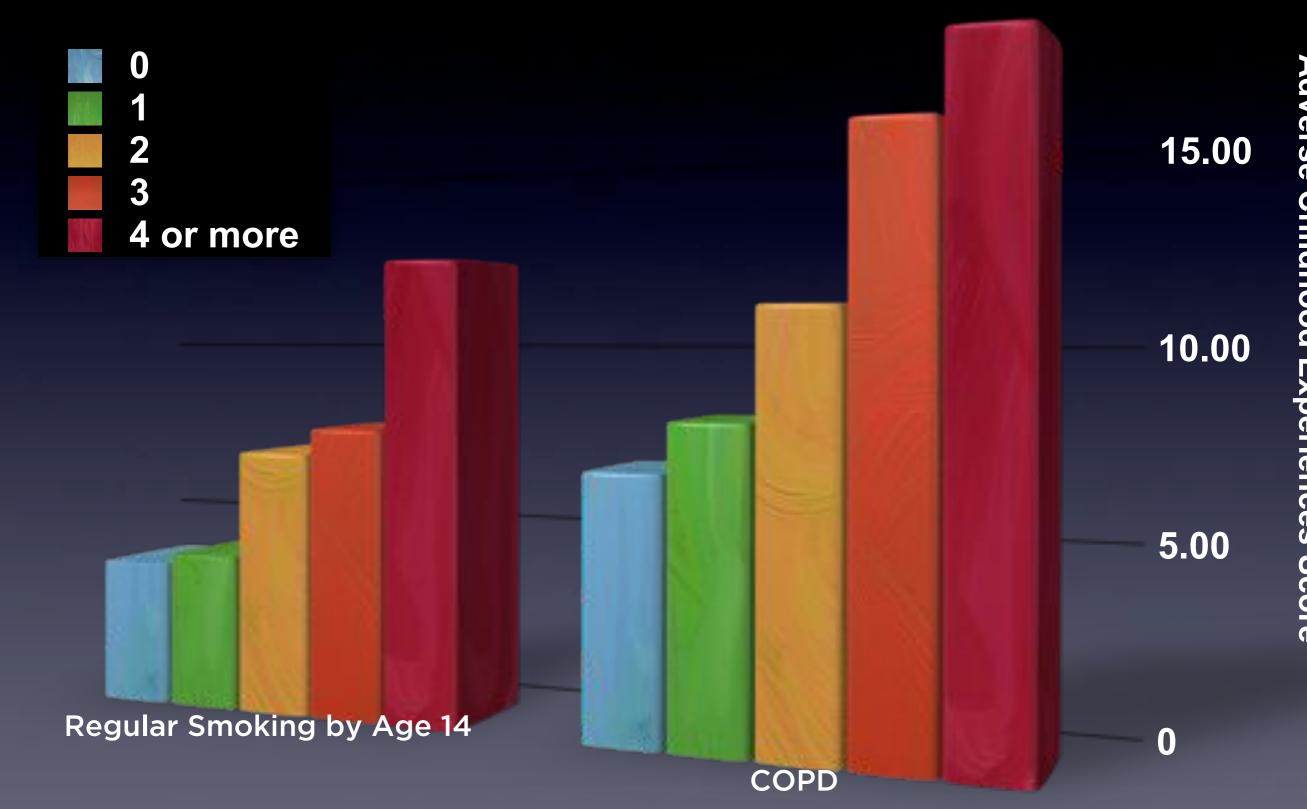
Source: Barth, et al. (2008) via Center on the Developing Child at Harvard University

Risk Factors for Adult Heart Disease are Embedded in Adverse Childhood Experiences

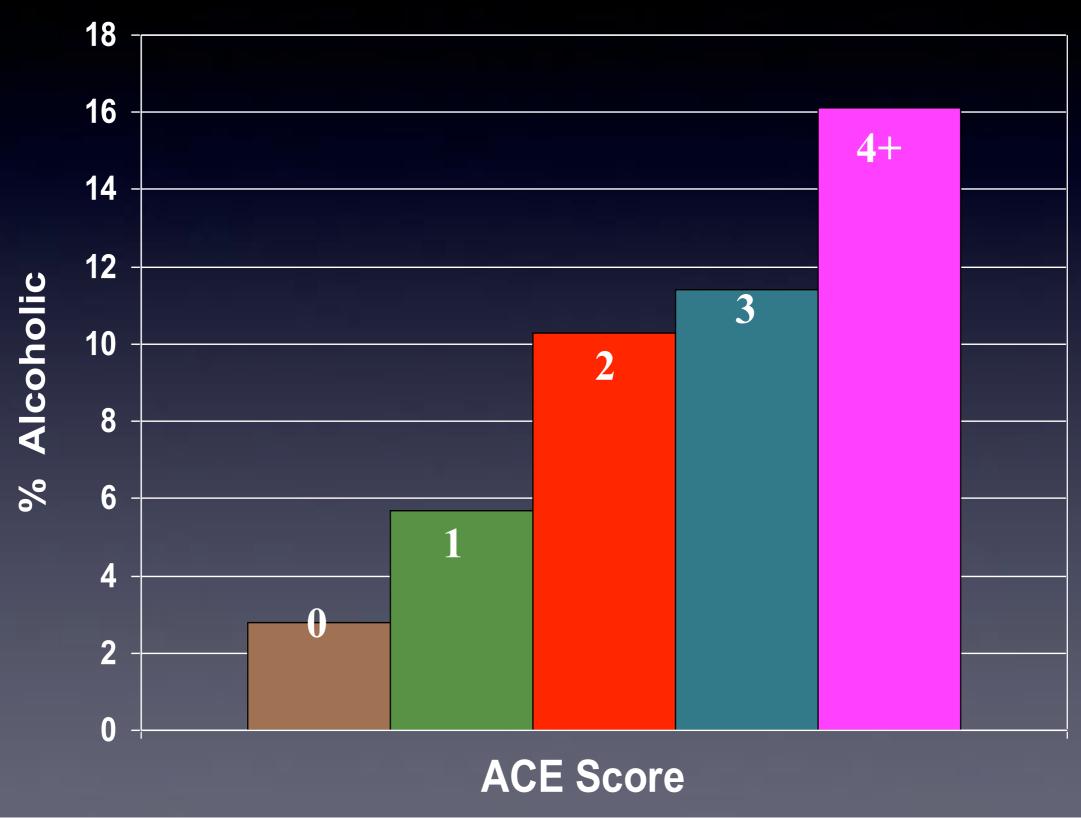


SMOKING & COPD

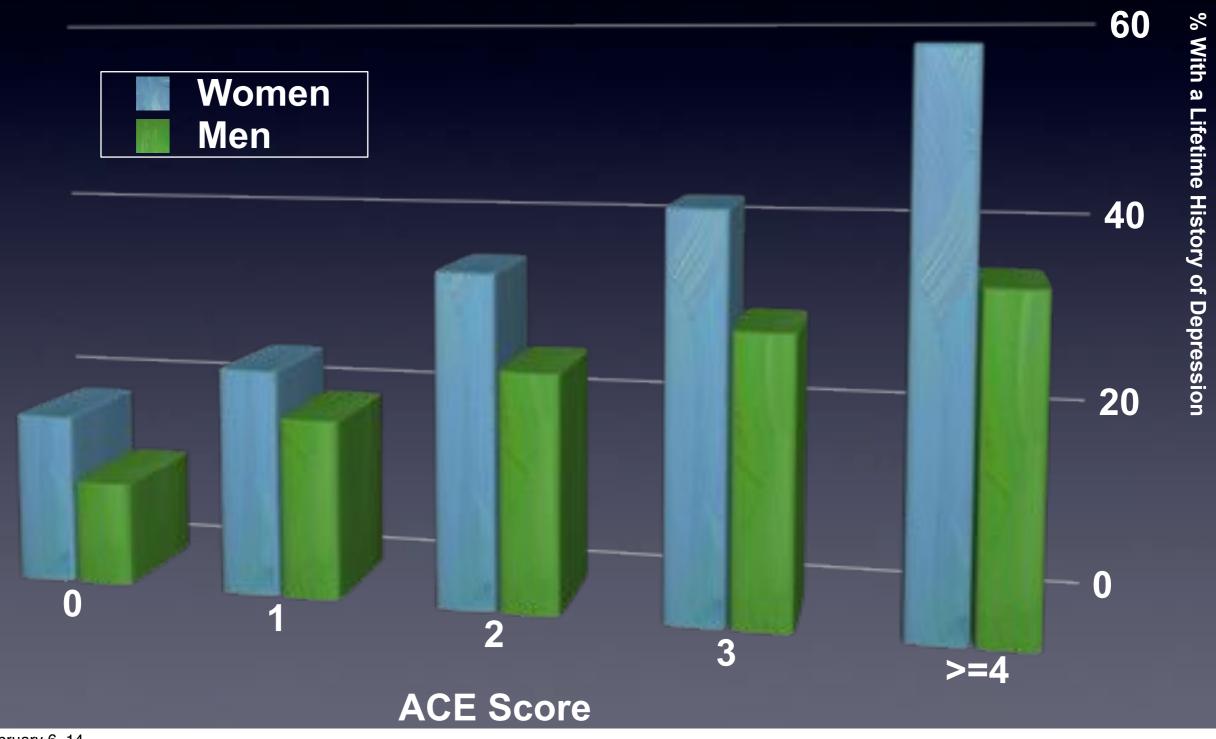
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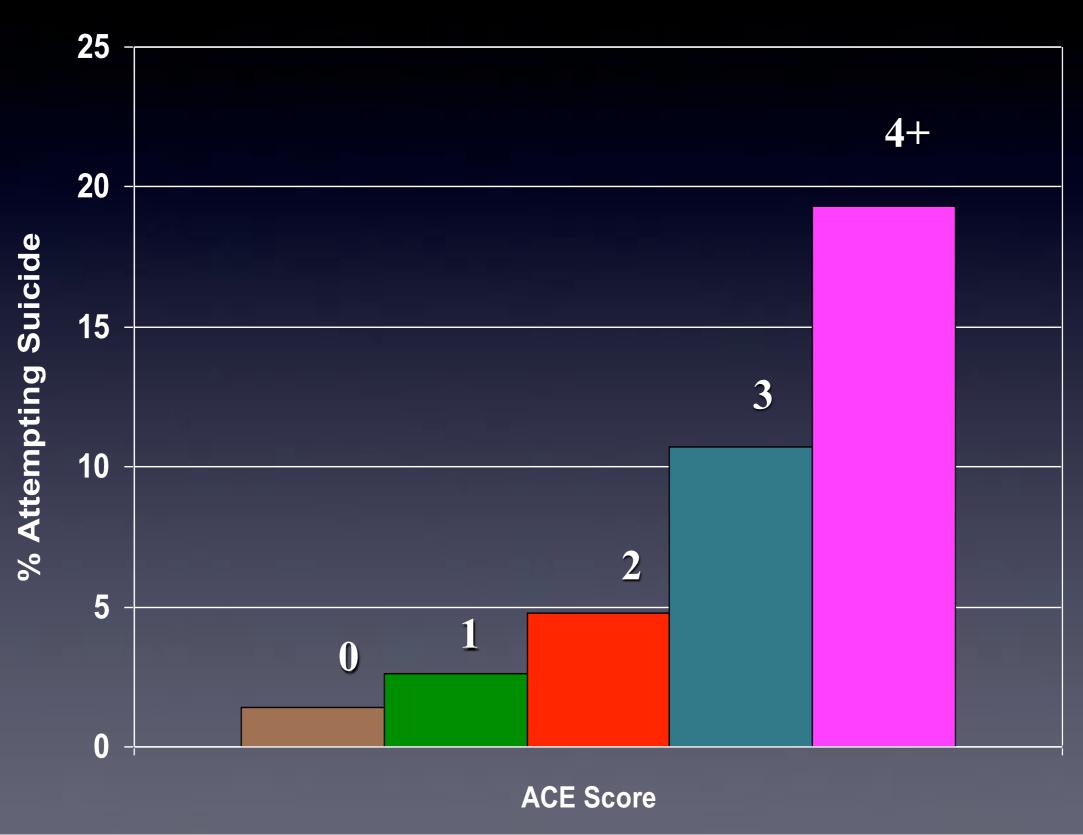
Childhood Experiences vs. Adult Alcoholism



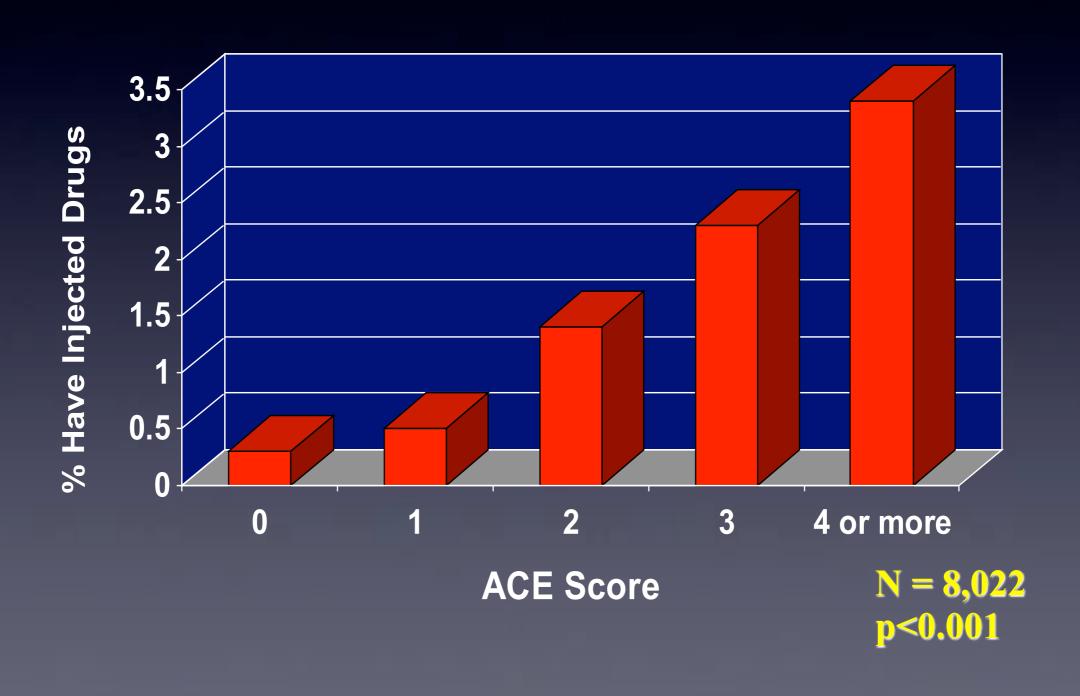
DEPRESSION



SUICIDE



IV DRUG USE



EARLY BRAIN AND CHILD DEVELOPMENT

Creating the right conditions for early childhood development is likely to be more effective and less costly than addressing problems at a later age.

Three Promising Domains for EBCD Innovation Jack Shonkoff, MD

Reduce emotional and behavioral barriers to learning.

Enhance the healthy development of children by transforming the lives of their parents.

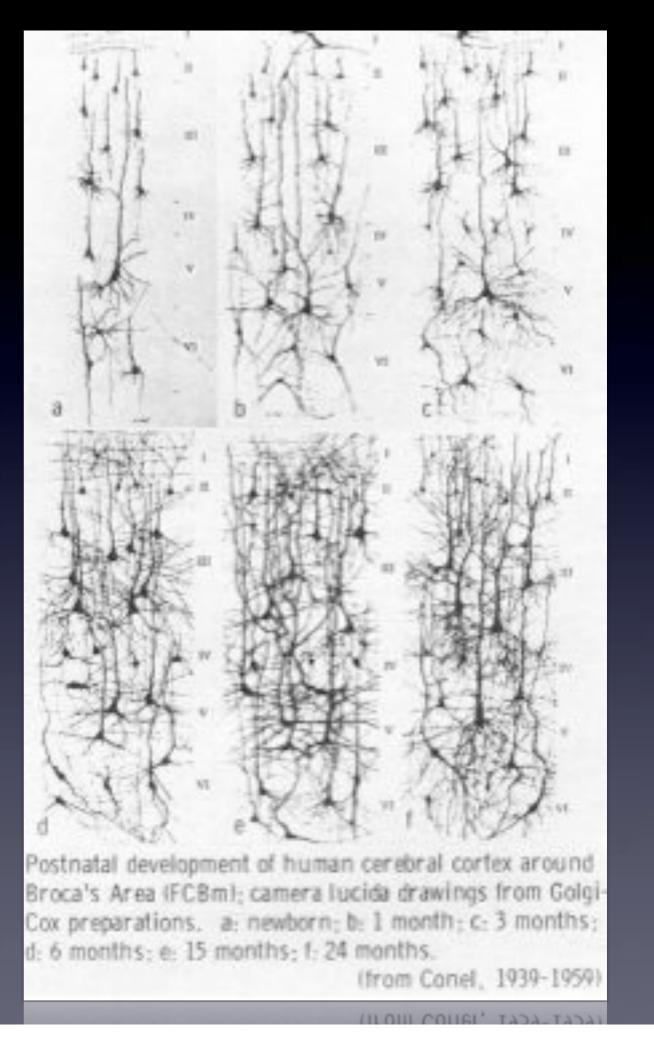
Reconceptualize the health dimension of early childhood policy and practice.

NONE OF THIS IS TO SAY...

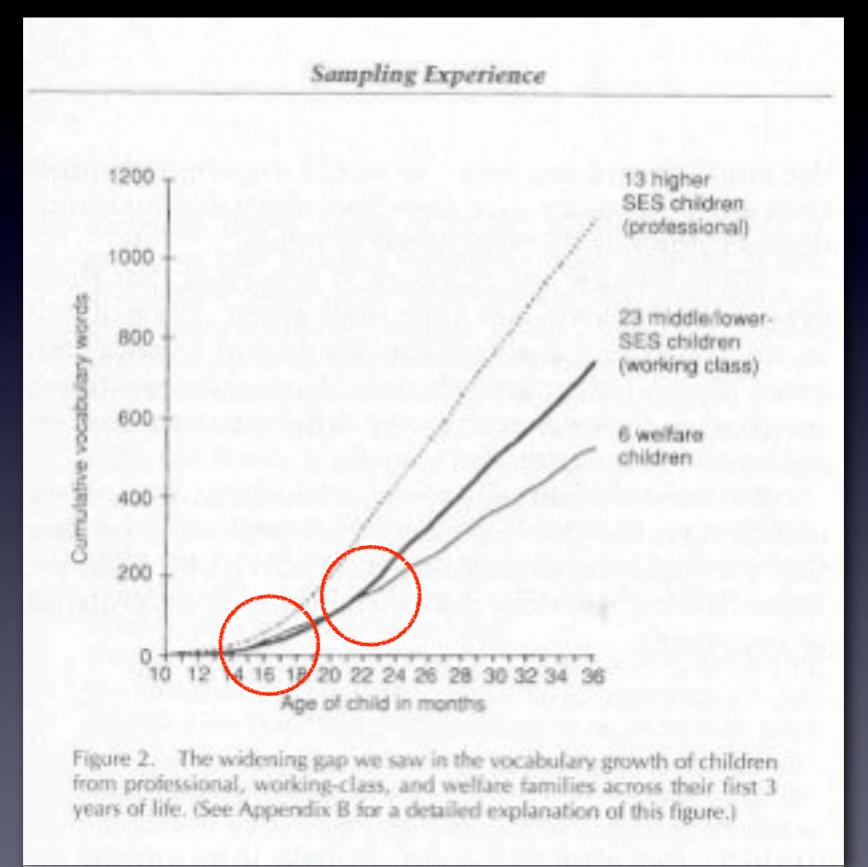
...that children should be engaged constantly
...that "bad things" are necessarily a long-term negative
...that children should not be appropriately disciplined



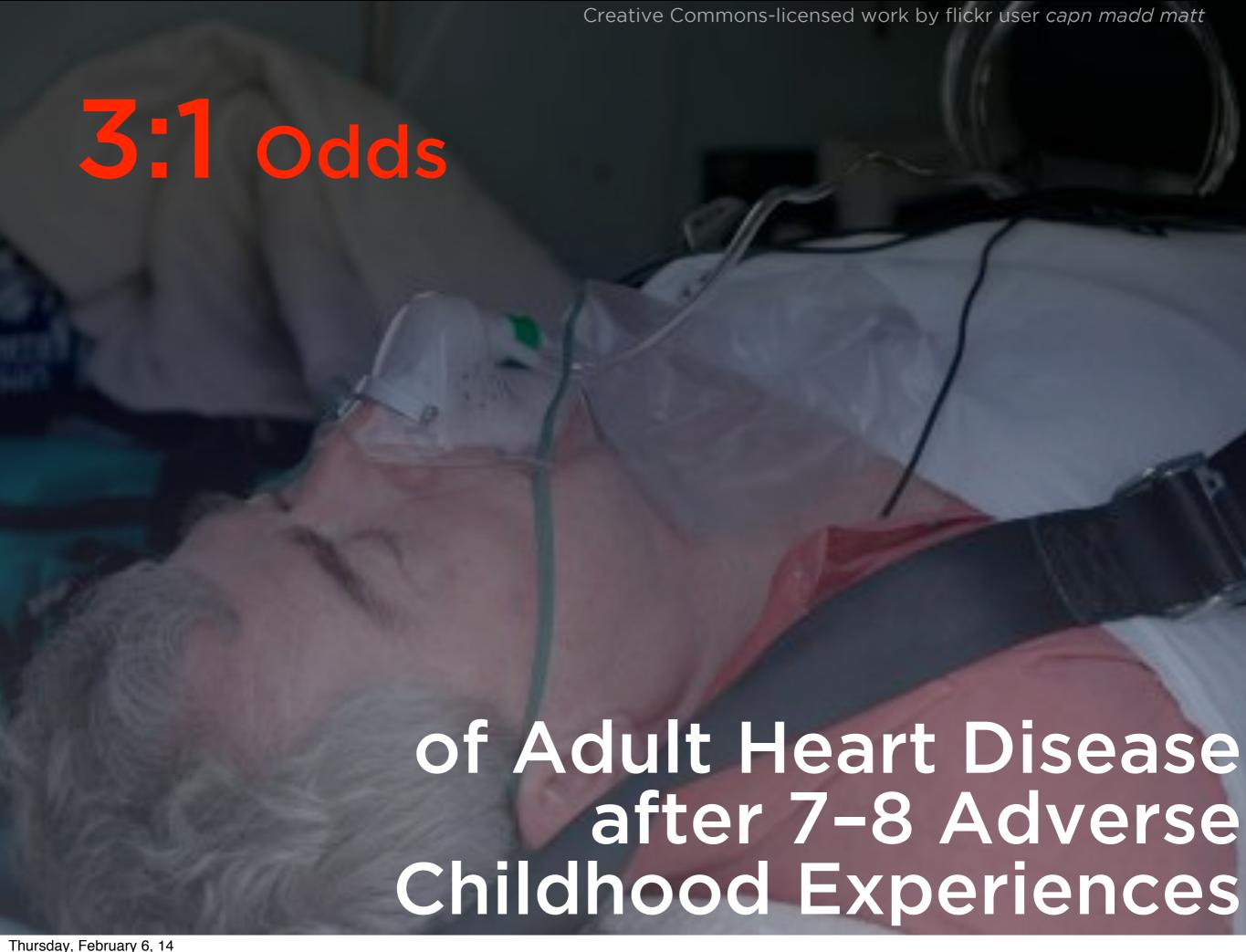
700 New Neural Connections per Second



18 Months:



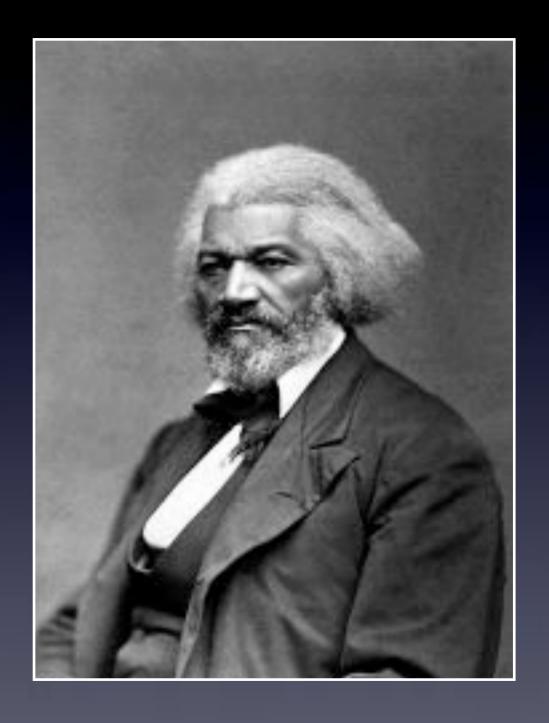






"It is easier to build strong children than to repair broken men."

> - Frederick Douglass (1817-1895)

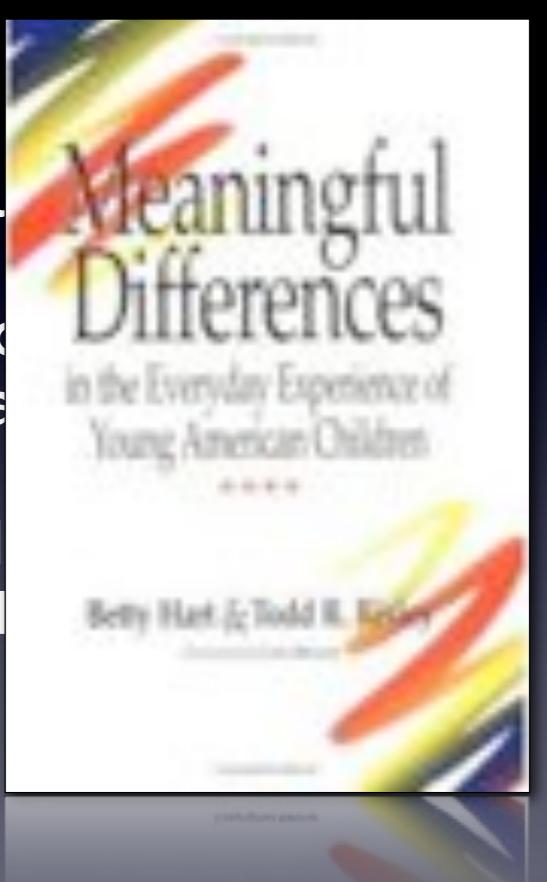




Reading Reality

Meaningfu in the Experience America

> Todd Betty I

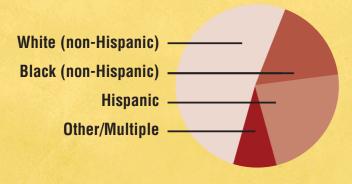


By Age 3	Welfare	Professionals	
Vocabulary Size	525 words	1100 words	
IQ	79	117	
Utterances	178/hour	487/hour	
Encouragements	75,000	500,000	
Discouragements	200,000	80,000	

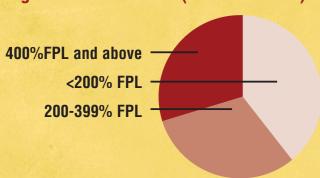
Children from low-income families hear as many as million fewer words than their more affluent peers before the age of 4.



Racial/Ethnic Distribution among Children Age 0-5 in New York (N~1.5 million)



Income Distribution among Children Age 0-5 in New York (N~1.5 million)



NEW YORK

NEW YORK	STATE	NATIONAL	STATE RANKING
Parental Reading			
% Children ages 0-5 read to daily 1	48.4	47.8	28
0/ Daily reading by payorty layel1			
% Daily reading by poverty level 1 Less than 200% FPL	42.3	40.3	32
200-399% FPL	46.9	3U.1	32
400% FPL or greater	58.9	58.9	25
	5616	30.0	
% Daily reading by race/ethnicity 1			
White (non-Hispanic)	58.1	55.0	17
Non-White	37.8	37.8	32
Black (non-Hispanic)	37.8	38.1	
Hispanic	33.9	33.4	
Other/Multiple Race	/	46.4	
% Daily reading by age 1			
Children age 0-3 years read to daily	46.9	48.3	32
Children age 4-5 years	50.9	47.0	17
Early Childhood Literacy Resources			
% Children served by ROR ²	19.5	12.8	8
% Children in/near poverty served by ROR ²	41.0	26.0	9
Number of children age 0-5 per public library ³	1,349	1,368	31*
School Performance			
% Students at or above Proficient in reading, Grade 44	34	30	17
% Children age 6-17 who have repeated			
at least one grade ¹	12.3	11.3	36*

Low-income children are at a disadvantage before school begins

A TYPICAL MIDDLE-CLASS 5-YEAR-OLD IS ABLE TO IDENTIFY 22 LETTERS AND SOUNDS OF THE ALPHABET, COMPARED TO JUST 9 LETTERS FOR A CHILD FROM A LOW-INCOME FAMILY.

(WORDEN AND BOETTCHER, 1990; EHRI AND ROBERTS, 2006)

ABCDEFGHIJKLMNOPQRSTUV WXXYZ

MIDDLE-INCOME CHILD'S LETTER RECOGNITION (22 LETTERS)

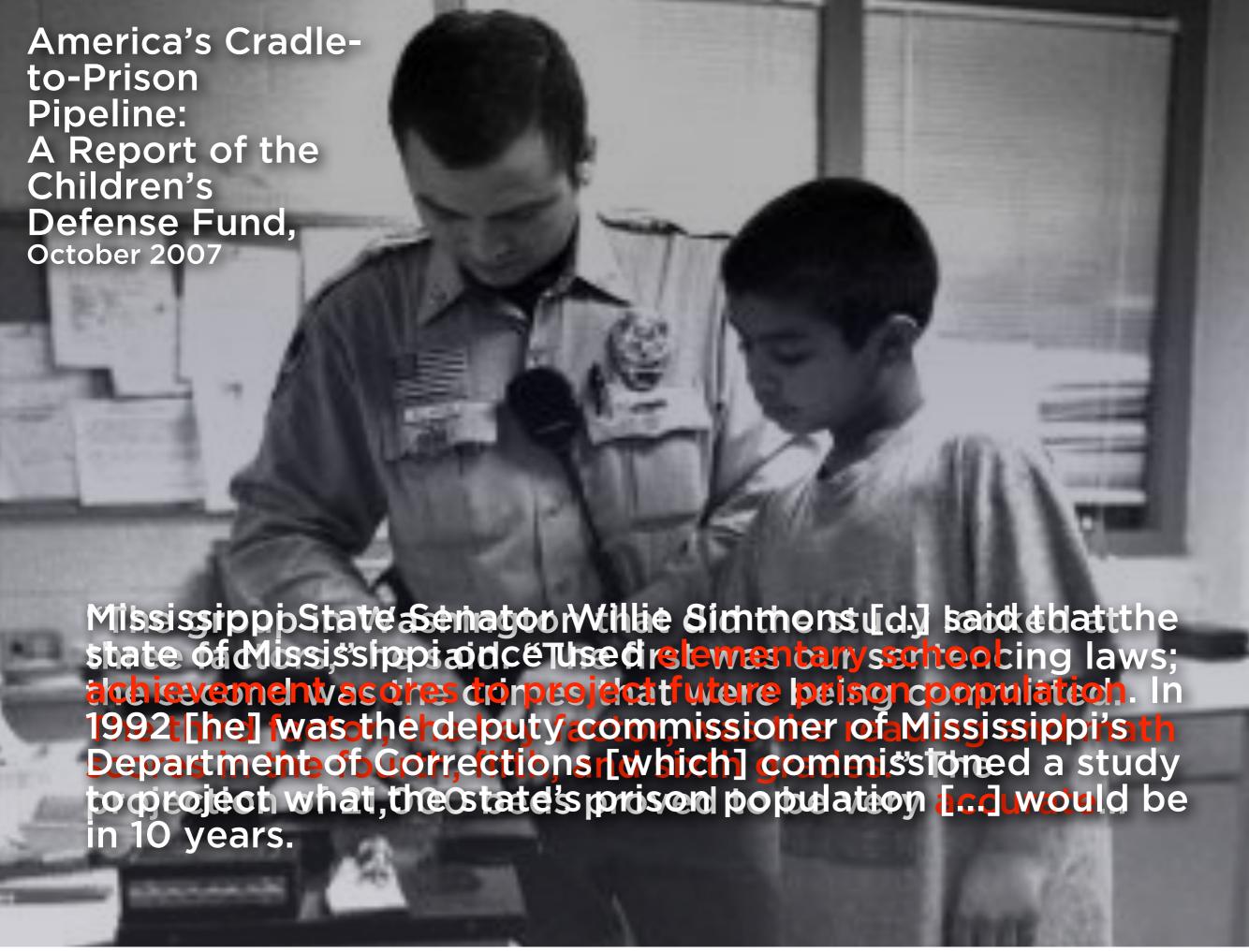
ABCDEFGHI JKLMNOPORSTUVWXYZ

LOW-INCOME CHILD'S LETTER RECOGNITION (9 LETTERS)

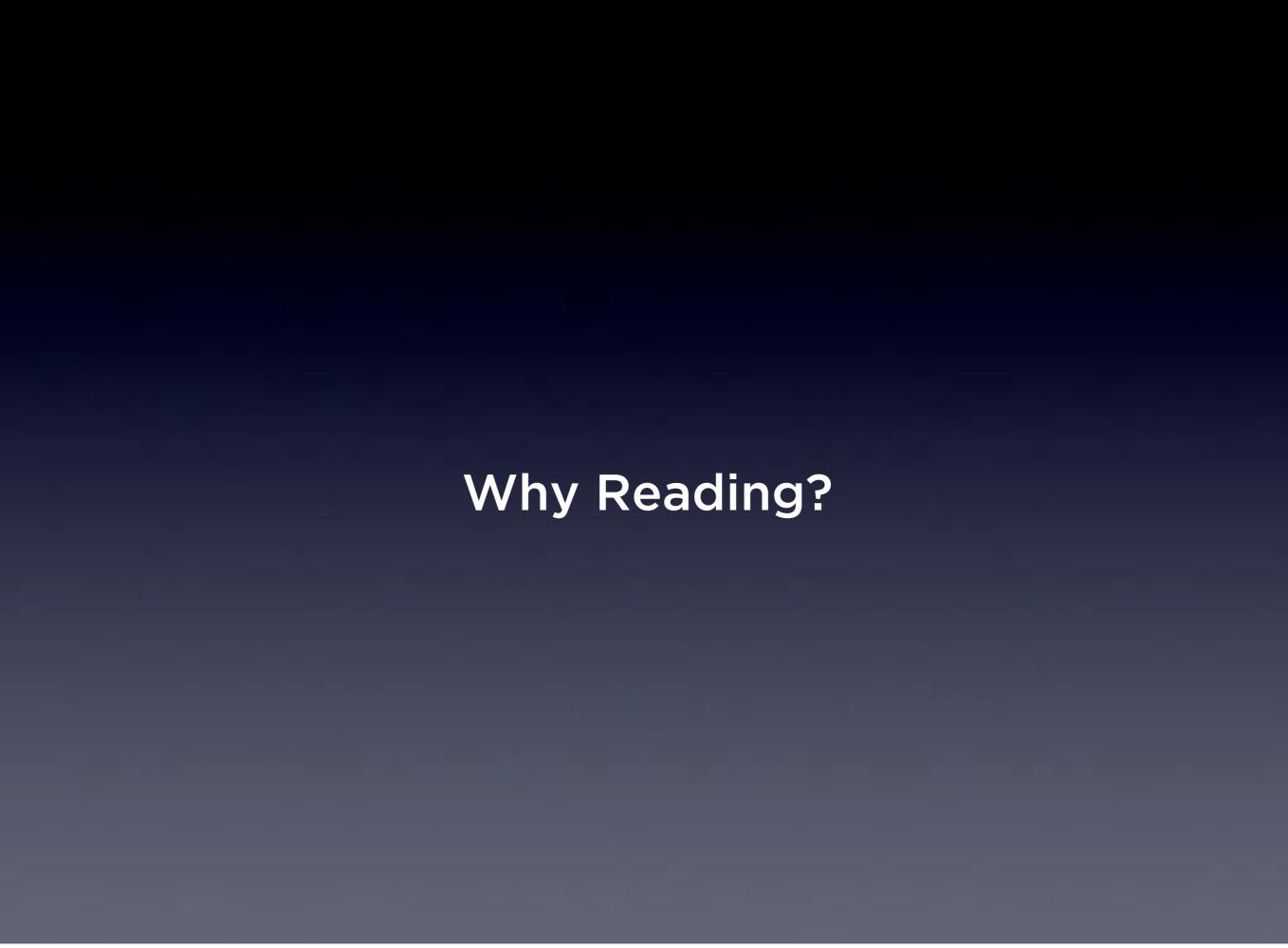
LOW-INCOME CHILD'S LETTER RECOGNITION (9 LETTERS)

One-third of children enter school unprepared to learn.

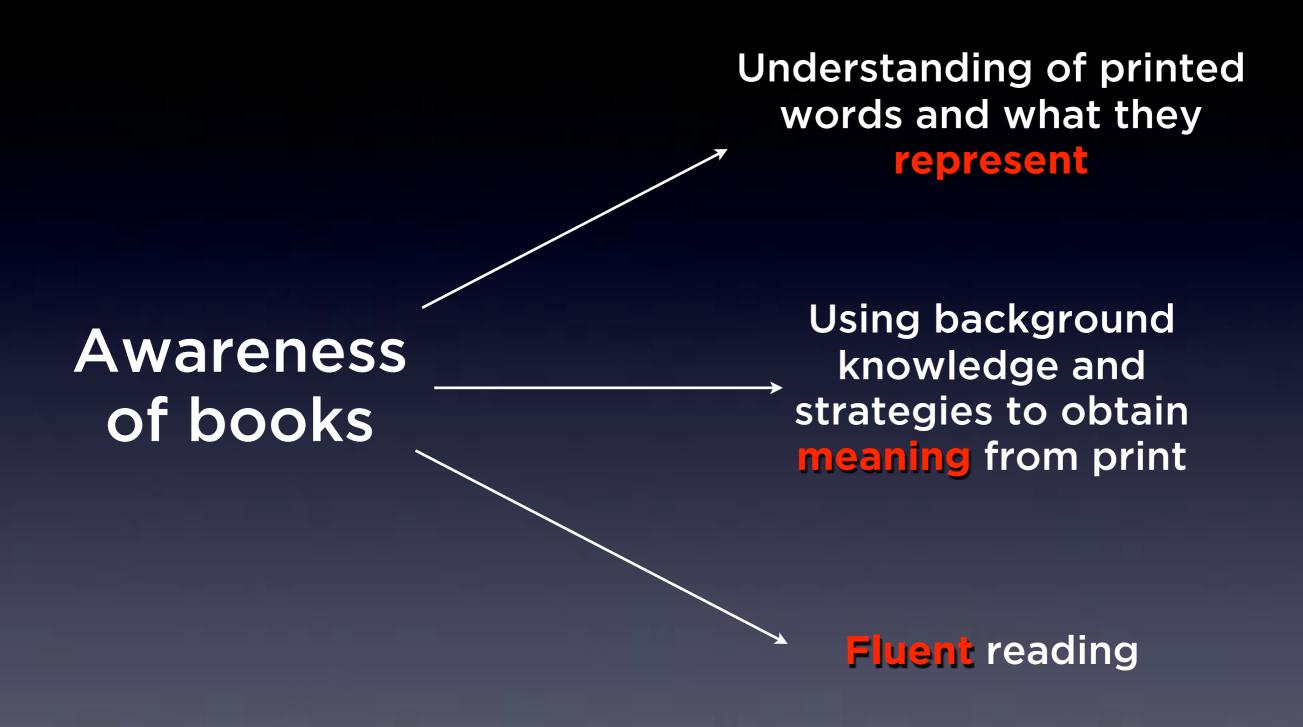
Most (88%)
will never
catch up.

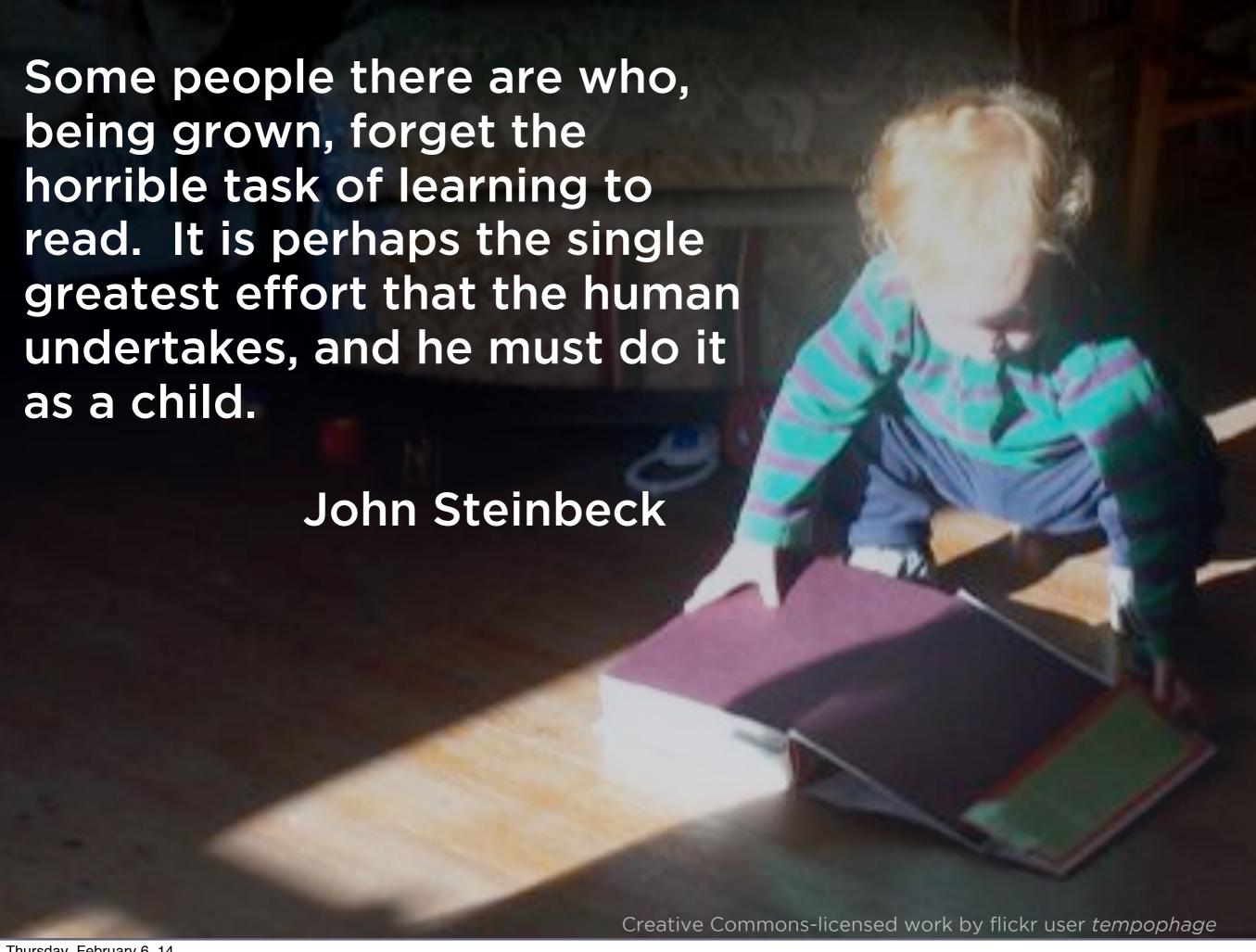






Reading is the fundamental skill for learning





Emergent Literacy:

the early display of an awareness by children that print conveys information. It is an amalgamation of children's oral language development and their initial attempts at reading and writing. Such attempts include "reading" the pictures of a book, or scribbling. Emergent literacy, if supported by meaningful interaction in oral and written language, evolves into full iteracy skills. (Teale & Sulzby, 1986)

Dialogic Reading:

The act of reading becomes a **conversation** between the adult and the child; the adult helps the child become the teller of the story by becoming the listener, questioner, and audience for the child.

Reading to children may not be a natural skill for adults.

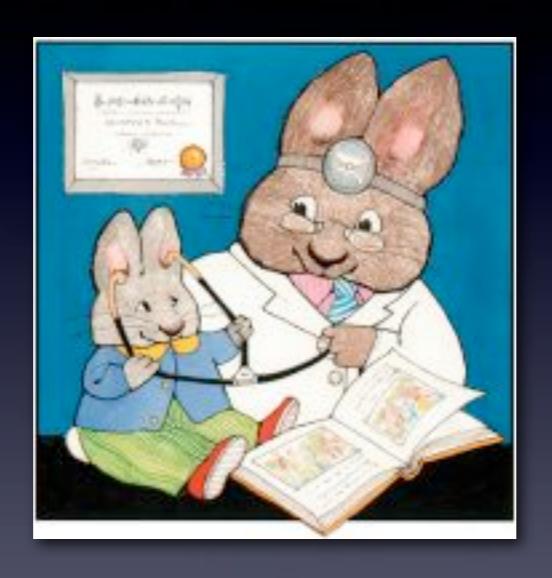
Reading at all may not be something an adult is capable of.

Reading problems may have been an issue for generations.



Part Inree

Reach Out and Read





One

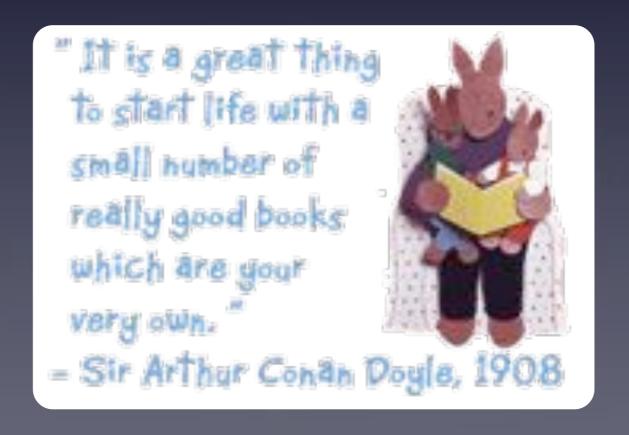
In the exam room, health care providers trained in the developmental strategies of early literacy encourage parents to read aloud to their young children, and offer age-appropriate tips.

	Prescription for Reading
Name:	
Date:_	Age:
	R Read Books
	□ Every night at bedtime
	☐ For minutes every day
	☐ As needed
	Refills: as requested at local public library
Signatu	re:
	Dipesh Navsaria, MPH, MSLIS, MD Pediatrician & Occasional Children's Librarian
Families	Please visit reading pediatrics wisc edu for more information on the joy

of sharing books together and how it can make a huge difference in your child's life.

of sharing books together and how it can make a huge difference in your child's life.

The primary care provider gives every child between the ages of 6 months and five years a new, developmentally-appropriate children's book to take home and keep.



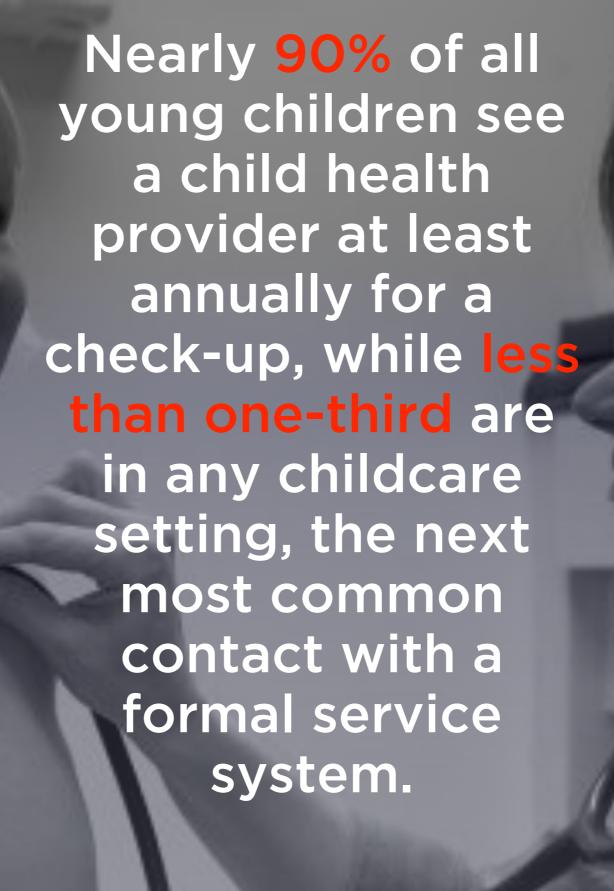
Three

Literacy-rich waiting rooms feature books, posters and reading nooks. Volunteers read aloud to children, showing parents and children the techniques and pleasures of looking at books together.

Our goal is not about

Teaching a child to actually read early

It is about learning to love books.



Charles Bruner, writing in The Colorado Trust's Issue Brief: Connecting Child Health and School Readiness,

Creative Commons-licensed work by flickr user dmason

February 2009

Evidence

15 studies published in peer-reviewed medical journals

ROR increases the likelihood that children at-risk will be read to regularly.

ROR improves language scores in young children at-risk.

ROR improves the home literacy environment.

There is more extensive published research available supporting the ROR model than for any other psychosocial intervention in general pediatrics.

The British *Millennium Cohort Study Pediatrics*, February 2010 12,500 children given vocabulary tests at age 5 Delays of almost a year in the poorest homes

"The research shows that a child who is read to every day at age 3 has a vocabulary at age 5 that is 1.92 months more advanced than a child who has exactly the same observable characteristics (including income group), but who is not read to every day at age 3."

"More affluent family circumstances are clearly associated with better parenting behaviours. At age 3, 78% of the richest children were **read to daily** and 91% had regular bedtimes, much higher than the corresponding numbers for the lowest income group."

"Nevertheless, it is still the case that 45% and 70% of the lowest income parents practiced these beneficial behaviours, providing grounds for optimism that good parenting can be adopted and extended in even the most disadvantaged families."

Parenting Behaviours, Perceptions, and Psychosocial Risk: Impacts on Young Children's Development Glascoe FP, Leew S. *Pediatrics*, January 2010 382 families assessed for child language development

"Of the families who seemed to be nonreaders or limited book readers, 21% had children at risk for developmental problems, compared with 12% of the families who were book readers...Families for whom book reading was uncommon were almost twice as likely to have a child with delays."

"By 6 months of age, children whose parents read aloud frequently outperformed children whose parents read rarely; this pattern continued through 24 months of age."

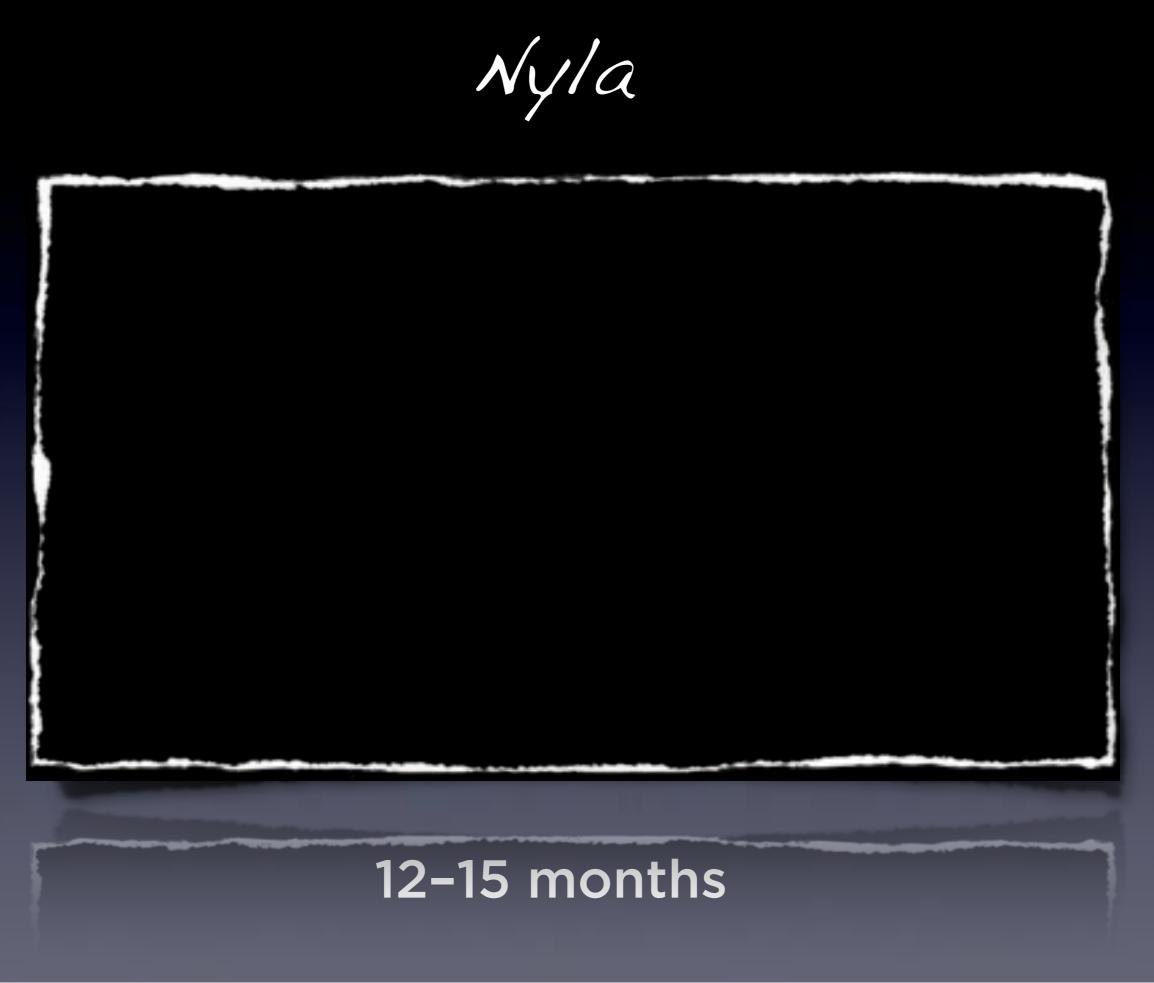
"Differences in communications skills increased with age, and the magnitude of the discrepancy between groups increased steadily with the age of the child."

"Another critical focus for future studies is to operationalize parenting behaviors/perceptions into developmental promotion interventions that are brief and workable in busy primary care settings, following the example of effectiveness research established by the Reach Out and Read program."

What we do

Reach Out and Read in the Exam Room

Videos courtesy of Reach Out and Read - Massachusetts



Constant, happy babble: exposed to language & books

Calms and tunes to Dad when she reads

Eagerly
explores book
with a very at a t a color back and turns
hands/mouth a t a color back and turns
hands/mouth a t a color back and turns

Allows Nyla control of book

Encouraged not to give up

Secribes enjoyment of quality time; notice joint attention

Parent

Points to objects to engage and teach



nearly 5,000 sites nationally...

in all 50 states...

serving over 4 million children...

via more than 28 thousand health care providers...

giving out over 6.5 million books a year!

ADVICE FOR PARENTS

Read aloud together daily.

Have a bedside lamp for your child and allow reading time every night possible.

Limit screen time to less than two hours a day.

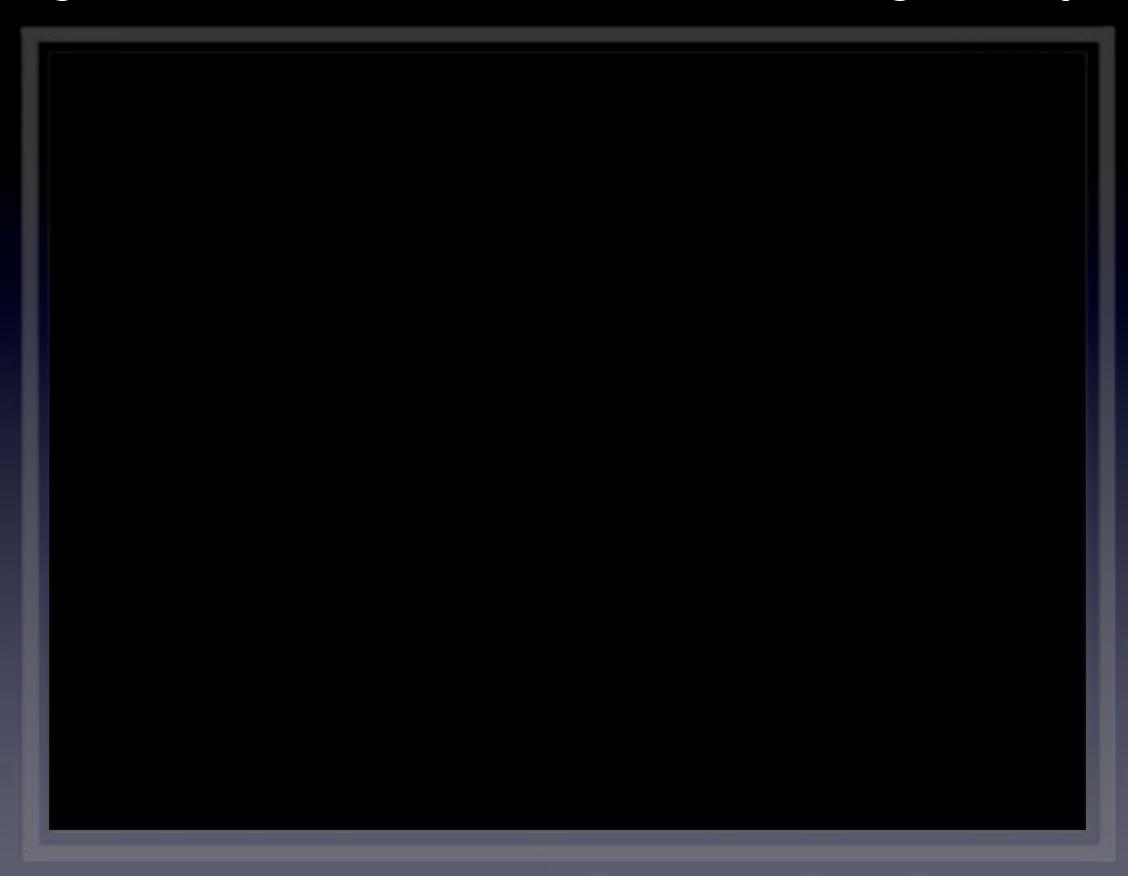
No TV, computers or video games in bedrooms.

Audio Books are fine.

Visit your school and public libraries.

Have reading be fun, not a chore.

Change the First Five Years and You Change Everything



Ounce of Prevention Fund

Accessible at http://youtu.be/GbSp88PBe9E

"While schools can do much to raise achievement among children who initially lag behind their peers, all too often pre-school gaps set in train a pattern of ever increasing inequality during school years and beyond. Any drive to improve social mobility must begin with an effective strategy to nurture the fledgling talent in young children so often lost before it has had a chance to flourish."

The Sutton Trust



